TRansportation ANalysis SIMulation System (TRANSIMS)

Version: TRANSIMS-LANL – 3.1

VOLUME ONE—PROJECT DESCRIPTION

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1. INTRODUCTION

The Transportation Sector of the National Infrastructure Simulation and Analysis Center (NISAC) is leveraged from the TRansportation ANalysis SIMulation System (TRANSIMS) project. TRANSIMS is a transportation simulation modeling system that was funded by the Department of Transportation and the Environmental Protection Agency. To meet the requirements of this modeling system, it was necessary to mimic the behaviors of each individual in an urban region. That is, a synthetic representation for each household in the entire urban region and the persons in the households is created. This representation includes demographics such as the ages of the persons, the household income, and where the household is located. Each synthetic person is assigned an itinerary of activities to carry out through a typical day. Routes across a multimodal transportation system are created to move the individuals from one activity location to another. The routes include driving, walking, biking, or movements by transit. These routes and transportation modes are microsimulated on a second-by-second basis. More information about TRANSIMS may be found in Part II (*Transportation Sector and Urban Population Dynamics*) of the NISAC document set, TRANSIMS, Volume Three (*Modules*).

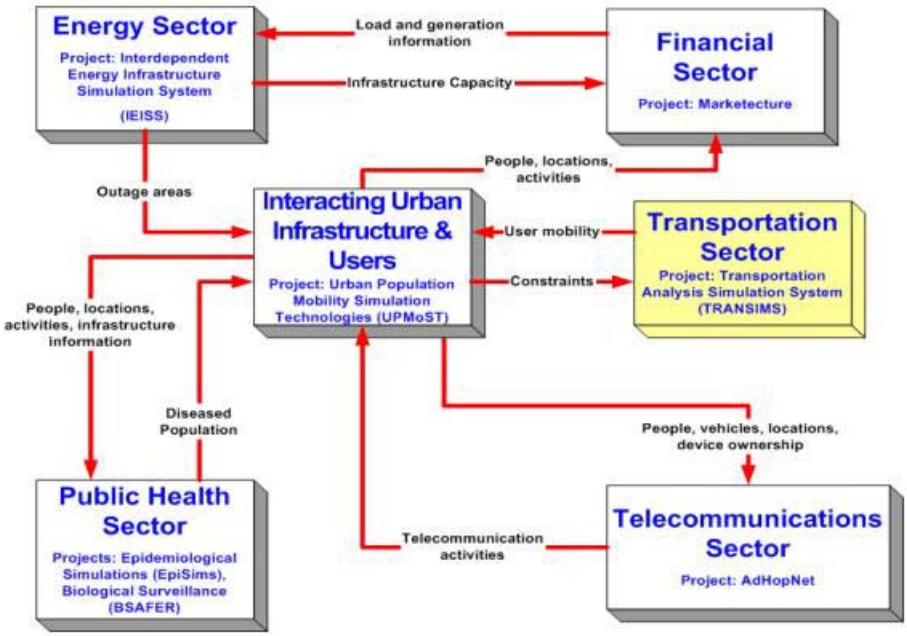

Fig. 1. The Transportation Sector interacts with UPMoST.

Fig. 1 shows the relationship of the Transportation Sector with UPMoST and the remainder of the NISAC modules. For more details, see Part II (*Transportation Sector and Urban Population Dynamics*) of this NISAC document set, UPMoST, Volume One (*Project Description*).

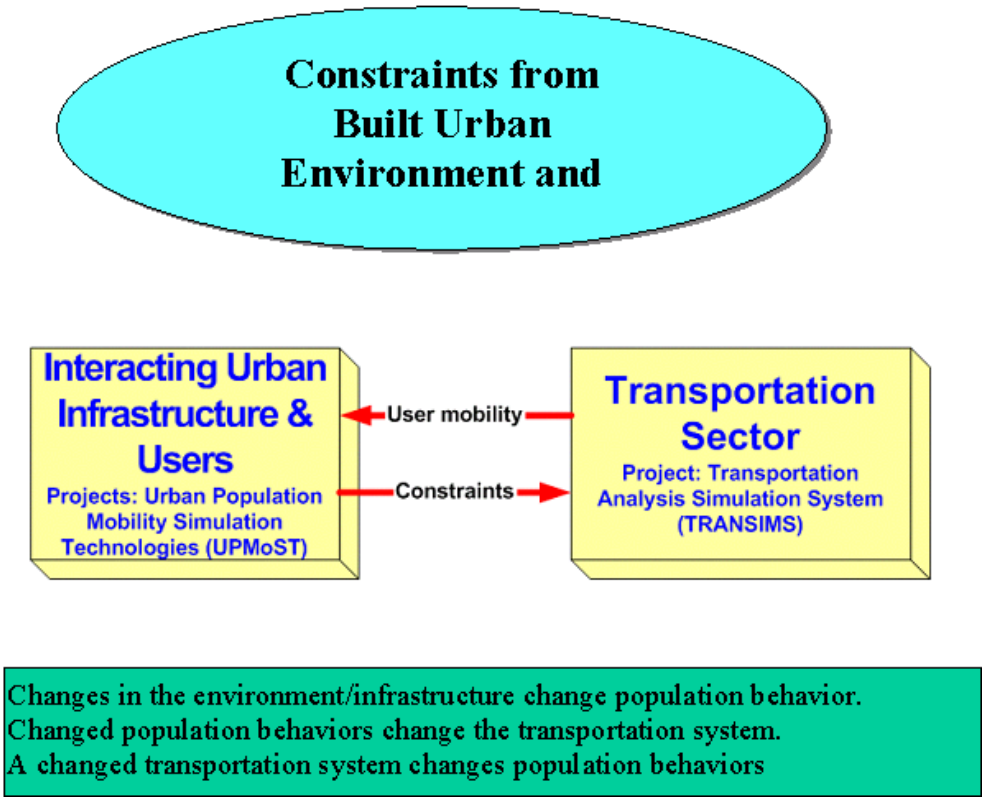

Fig. 2. Transportation Sector and UPMoST interactions.

Population movement and behavior in an urban environment are constrained by the built urban environment. Examples of these constraints are the roadways, places of employment, shopping locations, and the transit system. The built urban environment facilitates the ease of movement under normal conditions. However, in abnormal situations, such as evacuations, damaged infrastructures, or quarantines, the infrastructure may not be able to support these movements.

Fig. 2 shows UPMoST adding abnormal constraints to the transportation sector. In turn, population behavior, which is changed by these constraints, is passed through UPMoST to the other NISAC modules

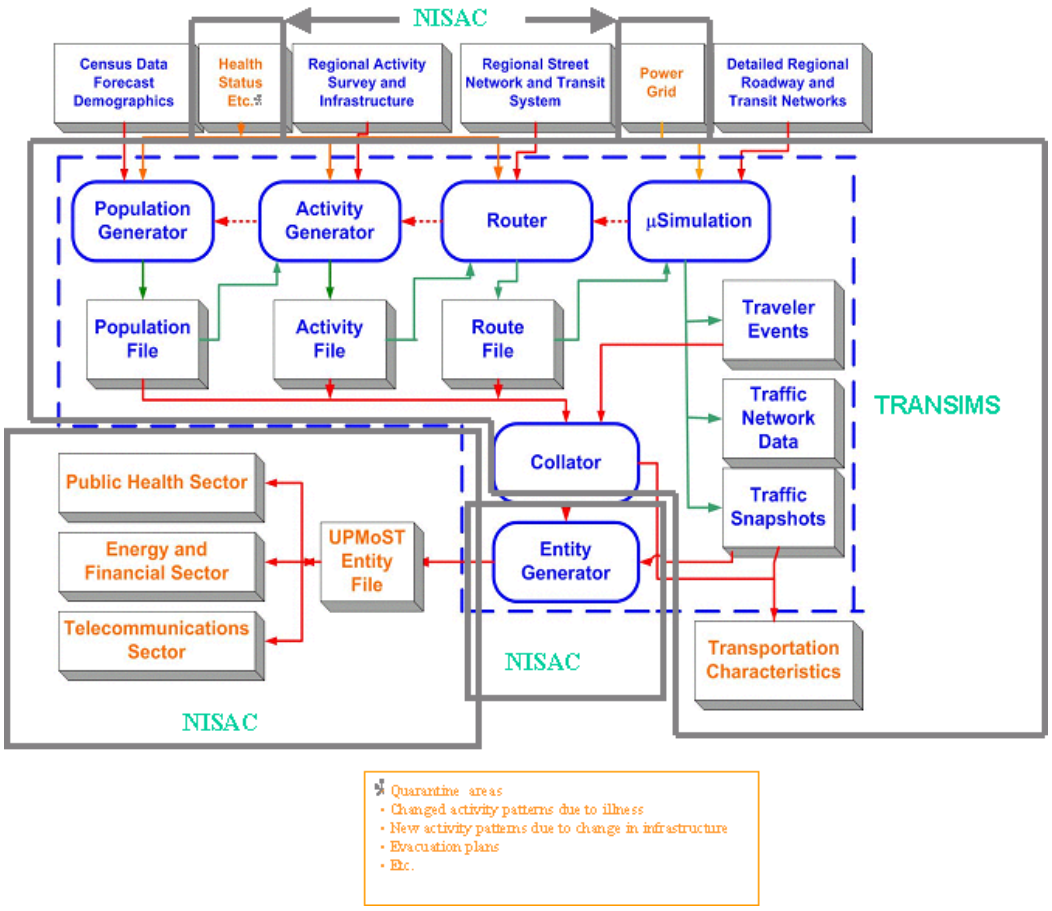

Fig. 3. TRANSIMS/UPMoST data flows.

The data flows for TRANSIMS and UPMoST are shown in . NISAC constraints are input as initial conditions. The protocols for this are under construction. Mobility data is extracted from TRANSIMS by the UPMoST Entity Generator. The Entity Generator has been completed. TRANSIMS is now being deployed in the transportation community.